Installation Instructions

CONTENTS

SAFETY CONSIDERATIONS

Installing, starting up, and servicing air-conditioning equipment can be hazardous due to system pressures, electrical components, and equipment location (roofs, elevated structures, etc).

Only trained, qualified installers and service mechanics should install, start up, and service this equipment (Fig. 1).

Untrained personnel can perform basic maintenance functions such as cleaning coils. All other operations should be performed by trained service personnel.

When working on the equipment, observe precautions in the literature and on tags, stickers, and labels attached to the equipment.

- Follow all safety codes.
- Wear safety glasses and work gloves.
- Keep quenching cloth and fire extinguisher nearby when brazing.
- Use care in handling, rigging, and setting bulky equipment.
- See Tables 1A and 1B for Physical Data.

ELECTRIC SHOCK HAZARD
Open all remote disconnects before servicing this equipment.

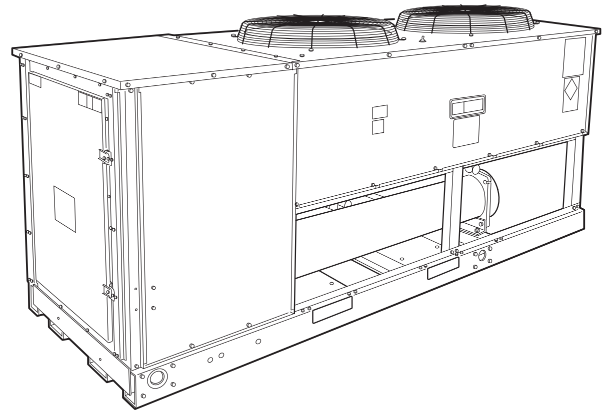


Fig. 1 — Model 30GTN (020 Shown)

INSTALLATION

Step 1 — Rig and Place the Unit

RIGGING — Preferred method is with spreader bars from above the unit. Use 2-in. (50 mm) OD pipe or hooks in lifting holes. Rig with 4 cables and spreader bars. All panels must be in place when rigging. See rigging label on unit for details concerning shipping weights, distance between lifting holes, center of gravity, and spreader bar dimensions. See Fig. 2.

If overhead rigging is not possible, place chiller on skid or pad for rolling or dragging. When rolling, use a minimum of 3 rollers. When dragging, pull the pad. *Do not apply force to the unit.* When in final position, raise from above to lift unit off pad.

⚠ CAUTION

All panels must be in place when rigging.

PLACING UNIT — There must be at least 4 ft (1.2 m) for service and for unrestricted airflow on all sides of unit, and a minimum of 8 ft (2.4 m) clear air space above unit. Provide ample room for servicing cooler. For cooler removal see clearance requirements in Fig. 3-5. For multiple units, allow 8 ft (2.4 m) separation between units for airflow and service.

If unit is to be used in an area with high solar radiation, mounted position should be such that control box is not exposed to direct solar radiation. Exposure to direct solar radiation could affect the temperature switch controlling cooler heaters. See Table 2.

Table 1A — Physical Data — 60 Hz

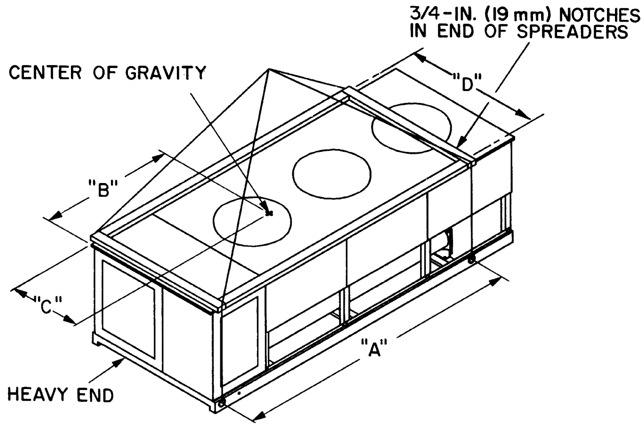
UNIT 30GTN	015	020	025	030	035
COMPRESSOR	Reciprocating, Semi-Hermetic				
No. ...Type	1...06DG537	1...06E2250	1...06E7265	1...06E7275	1...06E7299
No. Cyls (ea)...Speed, Rpm (r/s)	6...1750 (29)	4...1750 (29)	6...1750 (29)	6...1750 (29)	6...1750 (29)
Capacity Steps	3	2	3	3	3
Oil Charge*, Pt (L)	8 (3.8)	17 (8.0)	21 (9.9)	21 (9.9)	19 (9.0)
REFRIGERANT CHG, R-22					
→ **Total/Over Clear Glass, lb (kg)**	25.0 (11.3)/5.0 (2.3)	31.0 (14.1)/7.0 (3.2)	40.0 (18.1)/12.0 (5.4)	47.0 (21.3)/14.0 (6.4)	57.0 (25.9)/8.0 (3.6)
CONDENSER FANS, Type	Propeller Type, Direct Drive				
No. ...Diameter, in. (mm)	2...30 (762)		2...30 (762)		3...30 (762)
Total Airflow, Cfm (L/s)	10,600 (5000)		15,700 (7400)		23,700 (11 200)
Speed, Rpm (r/s)	1140 (19)		1140 (19)		1140 (19)
CONDENSER COIL, Type	Horizontal Plate Fin				
Rows...Fins/in. (Fin Spacing mm)	2...19 (1.34)	3...17 (1.49)	2...19 (1.34)	3...17 (1.49)	3...17 (1.49)
Total Face Area, sq ft (m²)	23.5 (2.18)	23.5 (2.18)	39.2 (3.64)	39.2 (3.64)	58.4 (5.43)
COOLER	Shell and Tube, Direct Expansion				
Net Water Volume, gal. (L)	6.8 (25.7)		9.9 (37.5)		12.8 (48.4)
Maximum Design Working Pressure psig (kPa)	Refrigerant Side — 235 (1620) Water Side — 150 (1034)				
WATER CONNECTIONS, in.					
Inlet and Outlet	2 FPT				2 1/2 FPT
Drain	3/4 MPT				3/4 MPT

*See Oil Charge section for Carrier-approved oil.

Table 1B — Physical Data — 50 Hz

UNIT 30GTN	015	020	025	030
COMPRESSOR	Reciprocating, Semi-Hermetic			
No. ...Type	1...06E2250	1...06E7265	1...06E7275	1...06E7299
No. Cyls (ea)...Speed, Rpm (r/s)	4...1450 (24.2)	6...1450 (24.2)	6...1450 (24.2)	6...1450 (24.2)
Capacity Steps	2	3	3	3
Oil Charge*, Pt (L)	17 (8.0)	21 (9.9)	21 (9.9)	19 (9.0)
REFRIGERANT CHG, R-22				
→ **Total/Over Clear Glass, lb (kg)**	26.0 (11.8)/6.0 (2.7)	35.0 (15.9)/8.0 (3.6)	42.0 (19.0)/12.0 (5.4)	49.0 (22.2)/14.0 (6.4)
CONDENSER FANS, Type	Propeller Type, Direct Drive			
No. ...Diameter, in. (mm)	2...30 (762)		2...30 (762)	
Total Airflow, Cfm (L/s)	10,600 (5000)		15,700 (7400)	
Speed, Rpm (r/s)	950 (15.8)		950 (15.8)	
CONDENSER COIL, Type	Horizontal, Plate Fin			
Rows...Fins/in. (Fin Spacing mm)	2...19 (1.34)	3...17 (1.49)	2...19 (1.34)	3...17 (1.49)
Total Face Area, sq ft (m²)	23.5 (2.18)	23.5 (2.18)	39.2 (3.64)	39.2 (3.64)
COOLER	Shell and Tube, Direct Expansion			
Net Water Volume, gal. (L)	6.8 (25.7)		9.9 (37.5)	
Maximum Design Working Pressure psig (kPa)	Refrigerant Side — 235 (1620) Water Side — 150 (1034)			
WATER CONNECTIONS, in.				
Inlet and Outlet	2 FPT			
Drain	3/4 MPT			

*See Oil Charge section for Carrier-approved oil.



UNIT 30GTN	MAXIMUM SHIP WT		LIFTING HOLES "A"		CENTER OF GRAVITY "B"		CENTER OF GRAVITY "C"		"D"	
	Lb	Kg	in.	mm	in.	mm	in.	mm	in.	mm
015	1876	851	94.0	2388	48.0	1219	23.0	583	49.5	1256
020	2031	921	94.0	2388	47.5	1207	23.0	583	49.5	1256
025	2415	1095	94.0	2388	51.0	1295	34.5	876	73.5	1867
030	2606	1182	94.0	2388	51.0	1295	34.5	876	73.5	1867
035	3365	1526	127.0	3225	66.5	1689	35.5	901	73.5	1867

Fig. 2 — Rigging with Spreader Bars (Field Supplied)

Table 2 — Temperature Limits for Standard Units

TEMPERATURE	F	C
Maximum Ambient Temperature	125	52
Minimum Ambient Temperature	0	–18
Maximum Cooler EWT*	95	35
Maximum Cooler LWT	70	21
Minimum cooler LWT†	38	3.3

LEGEND

EWT — Entering Fluid (Water) Temperature
LWT — Leaving Fluid (Water) Temperature

*For sustained operation, EWT should not exceed 85 F (29.4 C).
†Unit requires modification below this temperature.

MOUNTING UNIT — When unit is in proper location, use of mounting holes in base rails is recommended for securing unit to supporting structure, or for mounting unit on vibration isolators if required. See Fig. 3-5. Fasteners for mounting unit are field supplied. Be sure unit is level to ensure proper oil return to compressor.

Step 2 — Check Compressor Mounting — As shipped, compressor is held down by 4 bolts. After unit is installed, loosen each bolt using nut indicated in Fig. 6 until the flat washer (3/8 in.) can be moved with finger pressure.

Step 3 — Cooler Fluid and Drain Piping Connections — When facing the cooler side of the unit, the return water connection is on the left and the leaving water connection is on the right. See Fig. 3-5 and 7. Install a minimum 40-mesh strainer in the cooler fluid inlet line just ahead of and as close as possible to the cooler. Provide a means of venting air from the high point of the field-installed piping.

After field piping is complete, freeze-up protection is recommended using inhibited ethylene glycol or other suitable inhibited antifreeze solution and electric heat tapes in area where piping is exposed to low ambient temperatures (34 F [1 C] or below). Heat tapes should possess a rating for area ambients and be covered with a suitable thickness of closed-cell insulation. Route power for heating tapes from a separately-fused disconnect. Identify disconnect as heat tape power source with a warning that power must not be turned off except when unit is being serviced.

The cooler drain connection is at the opposite end from the compressor (See Fig. 3-5). Insulate the drain piping (in the same manner as the chilled water piping) for at least one ft (305 mm) from cooler.

PREPARATION FOR YEAR-ROUND OPERATION — If unit is on year-round operation, add sufficient inhibited ethylene glycol or other suitable inhibited antifreeze solution to chilled water to prevent freezing under low-ambient operating conditions. Consult local water authority on characteristics of area water and add a recommended inhibitor to the chilled water.

PREPARATION FOR WINTER SHUTDOWN — *Do not shut off control power disconnect during off-season shutdown.* At end of cooling season:

1. Drain water from system.
2. Replace drain plug and put 2 gallons (8 liters) of inhibited ethylene glycol (or other suitable inhibited antifreeze) in cooler to prevent freezing of residual water. (Remove plug on top of leaving chilled water nozzle to add liquid.)
3. At the beginning of the next cooling season, refill cooler and add recommended inhibitor.

NOTES:
1. There must be minimum 8 ft (2.4 m) clear air space above unit.
2. Dimensions in [   ] are in millimeters.
3. The approximate operating weight of the unit is:

60 Hz

UNIT	Lb	Kg
30GTN015	1640	744
30GTN015C	1732	786
30GTN020	1821	826
30GTN020C	1945	882

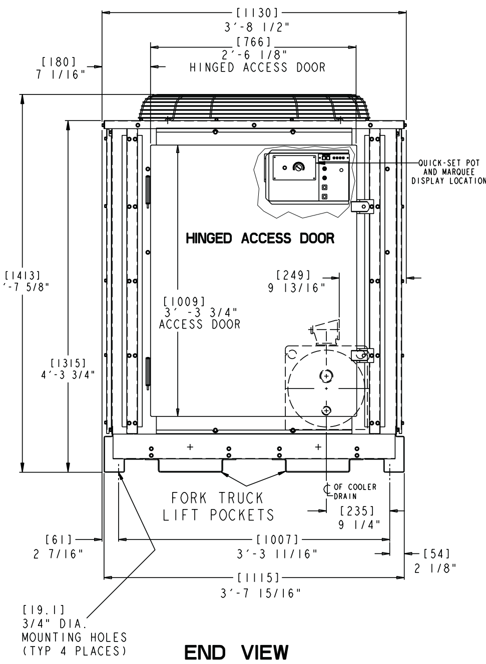
50 Hz

UNIT	Lb	Kg
30GTN015	1741	790
30GTN015C	1833	831
30GTN020	1864	846
30GTN020C	1988	902

UNIT	A
30GTN015	(1219)
	4′-0″
30GTN020	(1207)
	3′-11 1/2″

LEGEND

C — Copper Coils
COMPR — Compressor
MTG — Mounting
NEC — National Electrical Code (U.S.A.)
VAV — Variable-Air Volume



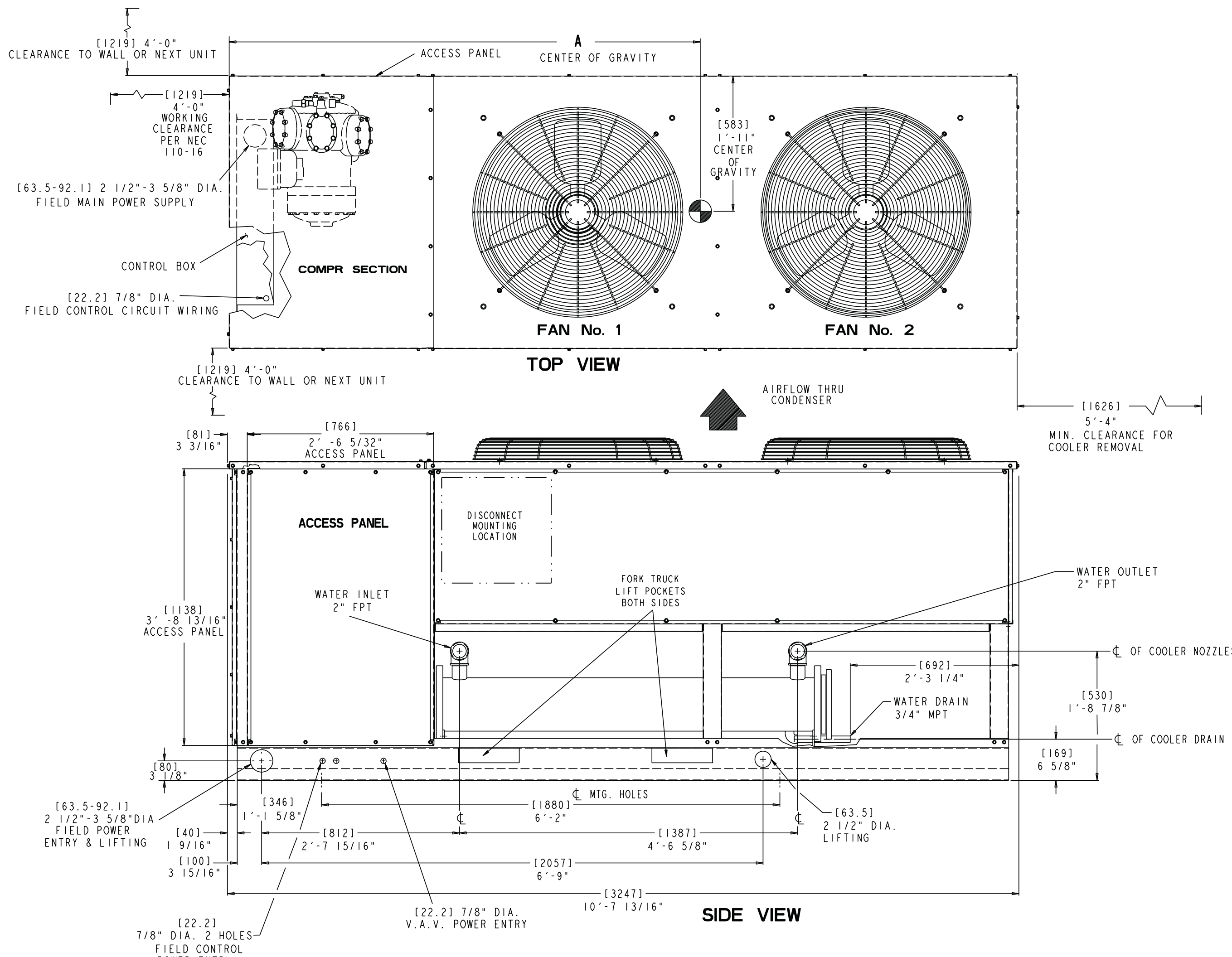


Fig. 3 — Dimensional Drawing, 30GTN015,020

NOTES:
1. There must be minimum 8 ft (2.4 m) clear air space above unit.
2. Dimensions in [ ] are in millimeters.
3. The approximate operating weight of the unit is:

60 Hz

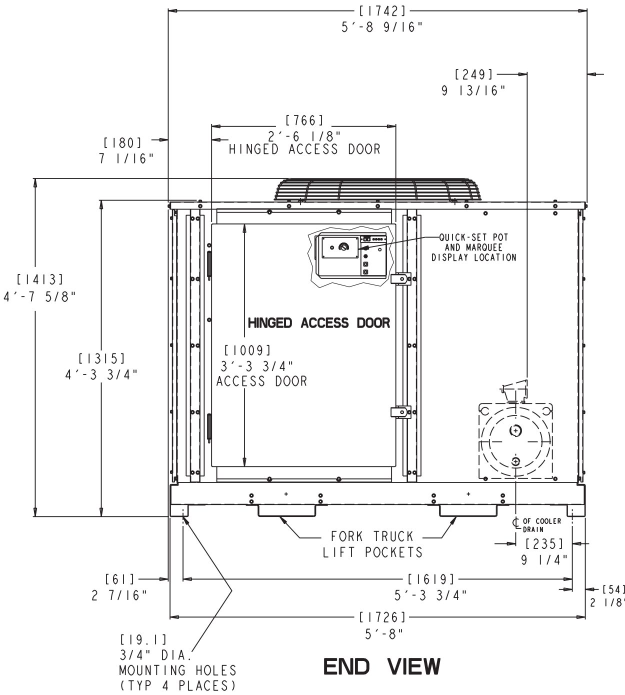
UNIT	Lb	Kg
30GTN025	2170	984
30GTN025C	2324	1054
30GTN030	2268	1029
30GTN030C	2474	1122

50 Hz

UNIT	Lb	Kg
30GTN025	2193	995
30GTN025C	2347	1065
30GTN030	2332	1058
30GTN030C	2538	1151

LEGEND

C — Copper Coils
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VAV — Variable-Air Volume



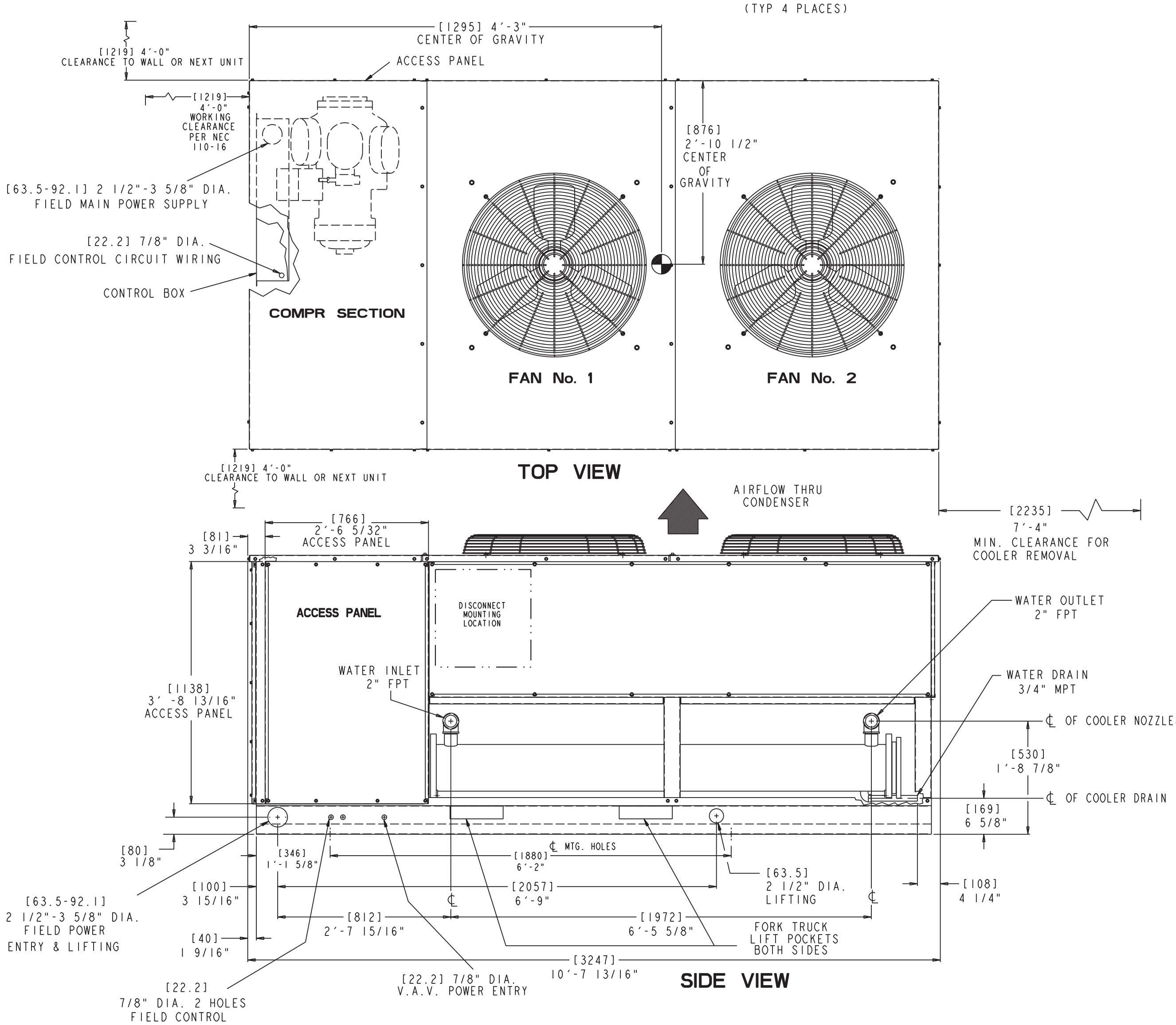


Fig. 4 — Dimensional Drawing, 30GTN025,030

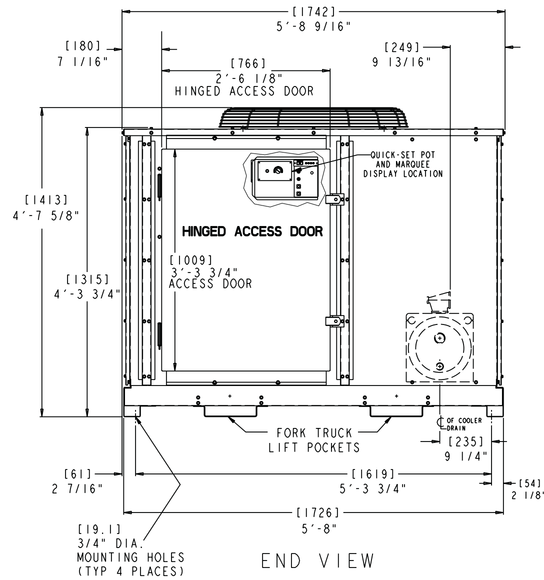
NOTES:
1. There must be minimum 8 ft (2.4 m) clear air space above unit.
2. Dimensions in [ ] are in millimeters.
3. The approximate operating weight of the unit is:

60 Hz

UNIT	Lb	Kg
30GTN035	2965	1345
30GTN035C	3273	1485

LEGEND

C — Copper Coils
COMPR — Compressor
MTG — Mounting
NEC — National Electrical Code (U.S.A.)



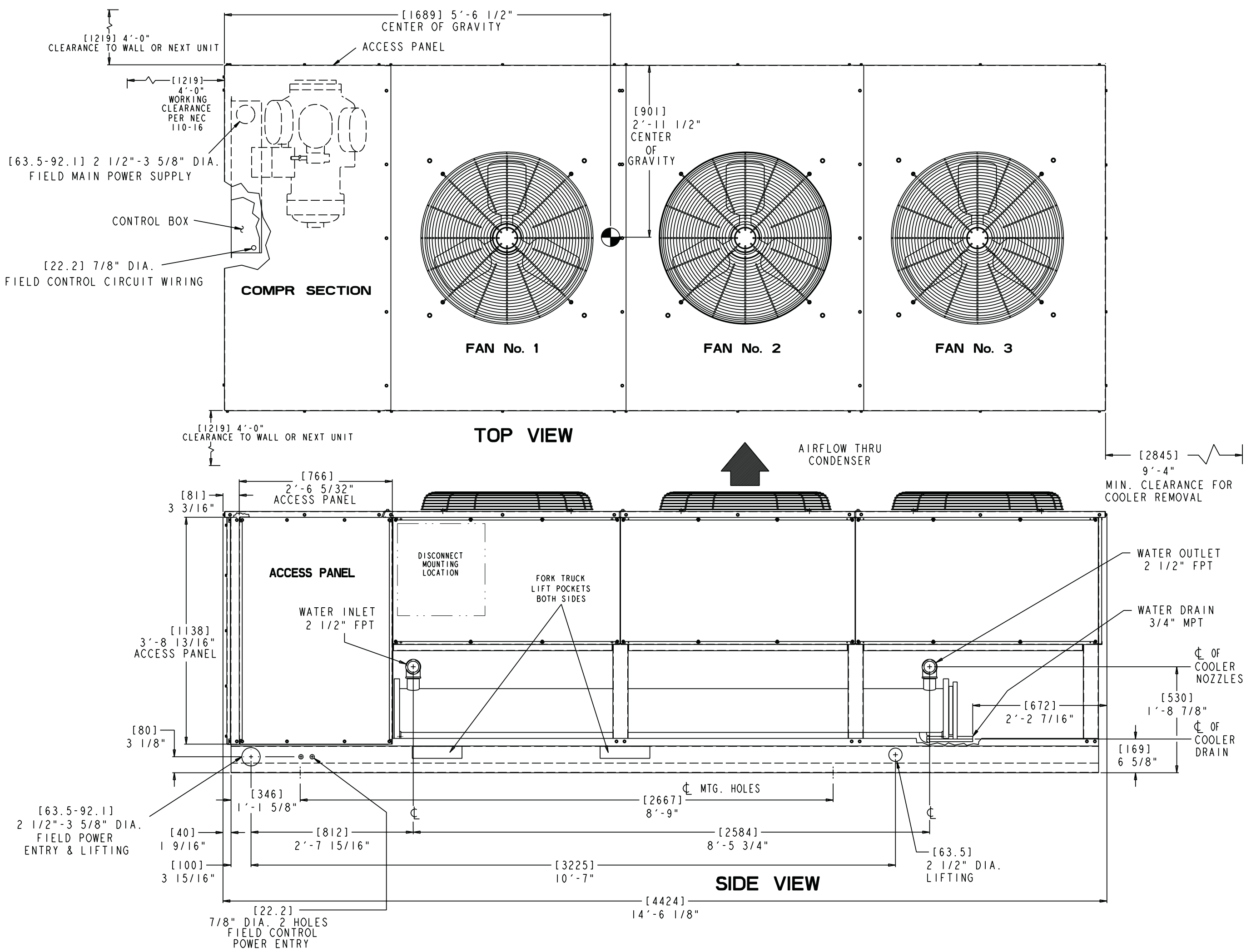
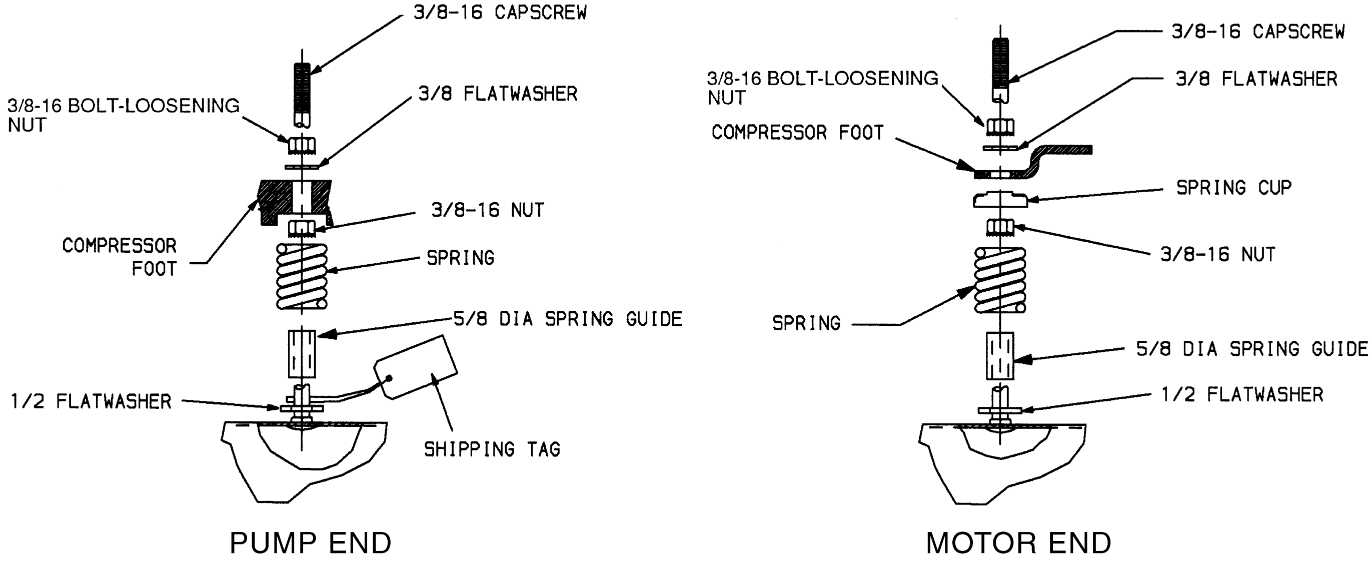


Fig. 5 — Dimensional Drawing, 30GTN035



NOTE: All dimensions are in inches.

Fig. 6 — Compressor Mounting

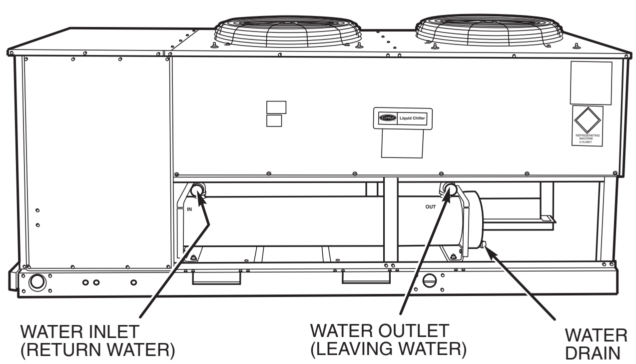


Fig. 7 — Water Connection Locations

Step 4 — Make Electrical Connections

POWER SUPPLY — Electrical characteristics of available power supply must agree with unit nameplate rating. Supply voltage must be within limits shown in Tables 3A and 3B.

IMPORTANT: Operating unit on improper supply voltage or with excessive phase imbalance constitutes abuse and may affect Carrier warranty.

POWER WIRING — All power wiring must comply with applicable local and national codes. Install field-supplied branch circuit fused disconnect(s) per NEC (National Electrical Code, U.S.A.) of a type that can be locked OFF or ON. Disconnect(s) must be within sight from and readily accessible from unit in compliance with NEC Article 440-14.

General Wiring Notes

1. The control circuit power must be from a separate source and must be brought through a field-supplied fused disconnect rated at 15 amps for 230-v and 30 amps for 115-v control power. Two terminal blocks are provided for field-wired control devices.
2. Crankcase and cooler heaters are wired in the control circuit so they are always operable as long as the control power disconnect is on and safety device is open or the Enable-Off-Remote contact switch is in the Off position. Heaters are wired so that they are energized even when power to the Main Base Board (MBB) is off. They are protected by a 7-amp fuse in field-supplied control power supply disconnect.
3. *The control circuit field-supplied disconnect should never be off except when unit is being serviced or is to be down for a prolonged period, in which case cooler should be drained. When operation is resumed, crankcase heater should be energized for 24 hours before start-up*.
4. Power entry is at one end only.
5. Maximum field wire sizes allowed by lugs on terminal block are:

   350 kcmil for 30GTN030,035 (208/230-3-60) and 30GTN030 (230-3-50) units.

   2/0 AWG for all other units.
6. Terminals for field power supply are suitable for copper, copper-clad aluminum, or aluminum conductors. Insulation must be rated 167 F (75 C) minimum.

Field Connections

Main Power — Bring wires from the fused disconnect switch through hole in bottom rail of unit to control box (Fig. 3-5) and connect to terminals on terminal block TB1 (See Fig. 8).

Control Power — Bring separate source power (see Fig. 8, note 2) into unit as shown in Fig. 3-5. This supplies power for control circuit, compressor crankcase heater, and cooler heater. Connect incoming wires to TB4 in unit control box (L1 to 1 and L2 to 2). Neutral side must be connected to the neutral terminal block (by C-A1) for 380-3-60 and 400-3-50 V units only. In the auxiliary power supply a field-supplied disconnect with 15-amp circuit protection must be provided to accommodate crankcase heater and cooler heater cable.

To comply with NEC Article 440-14, the disconnect must be located within sight from and readily accessible from unit.

IMPORTANT: To ensure power to the heaters, make sure auxiliary power to unit is always on (except for servicing or prolonged shutdown).

A toggle switch (marked Emergency On-Off on the unit label diagram and by the switch) allows the control circuit to be manually disconnected when necessary. This switch does not affect the crankcase heater and cooler heater cable.

Table 3A — Electrical Data — Standard Unit

UNIT SIZE 30GTN	UNIT							CONTROL CIRCUIT			
	Voltage V-Hz (3 Ph)	Supplied*		MCA	MOCP	ICF	Rec Fuse Size	V-Hz (Single Ph)	Supplied		MCA and MOCP
		Min	Max						Min	Max	
015	208/230-60	187	253	82.2	125	278.4	100	115-60	104	127	30
	460-60	414	506	38.3	60	126.2	45	115-60	104	127	30
	575-60	518	633	31.7	50	102.8	40	115-60	104	127	30
	380-60	418	342	43.9	70	152.8	60	230-60	198	254	15
	380/415-50	342	440	49.4	80	179.0	60	230-50	198	254	15
020	208/230-60	187	253	97.4	150	357.4	125	115-60	104	127	30
	460-60	414	506	49.6	80	179.2	60	115-60	104	127	30
	575-60	518	633	42.9	70	126.8	60	115-60	104	127	30
	380-60	418	342	51.1	80	198.8	60	230-60	198	254	15
	380/415-50	342	440	60.5	100	229.0	80	230-50	198	254	15
025	208/230-60	187	253	124.7	200	458.4	150	115-60	104	127	30
	460-60	414	506	60.7	100	229.2	80	115-60	104	127	30
	575-60	518	633	52.4	80	170.8	70	115-60	104	127	30
	380-60	418	342	64.7	110	254.8	80	230-60	198	254	15
	380/415-50	342	440	68.5	110	259.0	90	230-50	198	254	15
030	208/230-60	187	253	145.5	250	518.4	175	115-60	104	127	30
	460-60	414	506	68.7	110	259.2	90	115-60	104	127	30
	575-60	518	633	54.9	90	182.8	70	115-60	104	127	30
	380-60	418	342	73.6	125	287.8	90	230-60	198	254	15
	380/415-50	342	440	87.8	150	351.0	110	230-50	198	254	15
035	208/230-60	187	253	203.0	350	708.6	250	115-60	104	127	30
	460-60	414	506	91.1	150	354.3	110	115-60	104	127	30
	575-60	518	633	81.6	125	286.2	100	115-60	104	127	30
	380-60	418	342	111.1	175	393.7	150	230-60	198	254	15

See Legend and Notes on page 9.

Table 3B — Electrical Data — Unit with Factory-Installed Motormaster® I Control

UNIT SIZE 30GTN	UNIT							CONTROL CIRCUIT			
	Voltage V-Hz (3 Ph)	Supplied*		MCA	MOCP	ICF	Rec Fuse Size	V-Hz (Single Ph)	Supplied		MCA and MOCP
		Min	Max						Min	Max	
015	208/230-60	187	253	82.2	125	278.4	100	115-60	104	127	30
	460-60	414	506	38.3	60	129.3	45	115-60	104	127	30
	575-60	518	633	30.8	50	105.6	40	115-60	104	127	30
	380-60	418	342	43.9	70	152.8	60	230-60	198	254	15
	380/415-50	342	440	51.9	80	181.5	70	230-50	198	254	15
020	208/230-60	187	253	97.4	150	357.4	125	115-60	104	127	30
	460-60	414	506	49.6	80	182.3	60	115-60	104	127	30
	575-60	518	633	42.0	70	129.6	50	115-60	104	127	30
	380-60	418	342	51.1	80	198.8	60	230-60	198	254	15
	380/415-50	342	440	63.0	100	231.5	80	230-50	198	254	15
025	208/230-60	187	253	124.7	200	458.4	150	115-60	104	127	30
	460-60	414	506	60.7	100	232.3	80	115-60	104	127	30
	575-60	518	633	51.5	80	173.6	70	115-60	104	127	30
	380-60	418	342	64.7	110	254.8	80	230-60	198	254	15
	380/415-50	342	440	71.0	110	261.5	90	230-50	198	254	15
030	208/230-60	187	253	145.5	250	518.4	175	115-60	104	127	30
	460-60	414	506	68.7	110	262.3	90	115-60	104	127	30
	575-60	518	633	54.0	90	185.6	70	115-60	104	127	30
	380-60	418	342	73.6	125	287.8	90	230-60	198	254	15
	380/415-50	342	440	90.3	150	353.5	110	230-50	198	254	15
035	208/230-60	187	253	203.0	350	708.6	250	115-60	104	127	30
	460-60	414	506	91.1	150	357.4	110	115-60	104	127	30
	575-60	518	633	80.7	125	289.0	100	115-60	104	127	30
	380-60	418	342	111.1	175	393.7	150	230-60	198	254	15

LEGEND

ICF — Maximum Instantaneous Current Flow during starting (the point in the starting sequence where the sum of the LRA for the starting compressor, plus the total RLA for all running compressors, plus the total FLA for all running fan motors is maximum).
MCA — Minimum Circuit Amps (complies with National Electrical Code [NEC, U.S.A.], Section 430-24)
MOCP — Maximum Overcurrent Protection

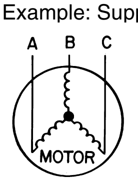
*Units are suitable for use on electrical systems where voltage supplied to unit terminals is not below or above listed minimum and maximum limits.

NOTE: Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percent voltage imbalance.

Percent Voltage Imbalance

$$= 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

Example: Supply voltage is 240-3-60.



AB = 243 v
BC = 236 v
AC = 238 v

$$\text{Average voltage} = \frac{243 + 236 + 238}{3}$$

$$= 239 \text{ v}$$

Determine maximum deviation from average voltage:

(AB) 243 – 239 = 4 v
(BC) 239 – 236 = 3 v
(AC) 239 – 238 = 1 v

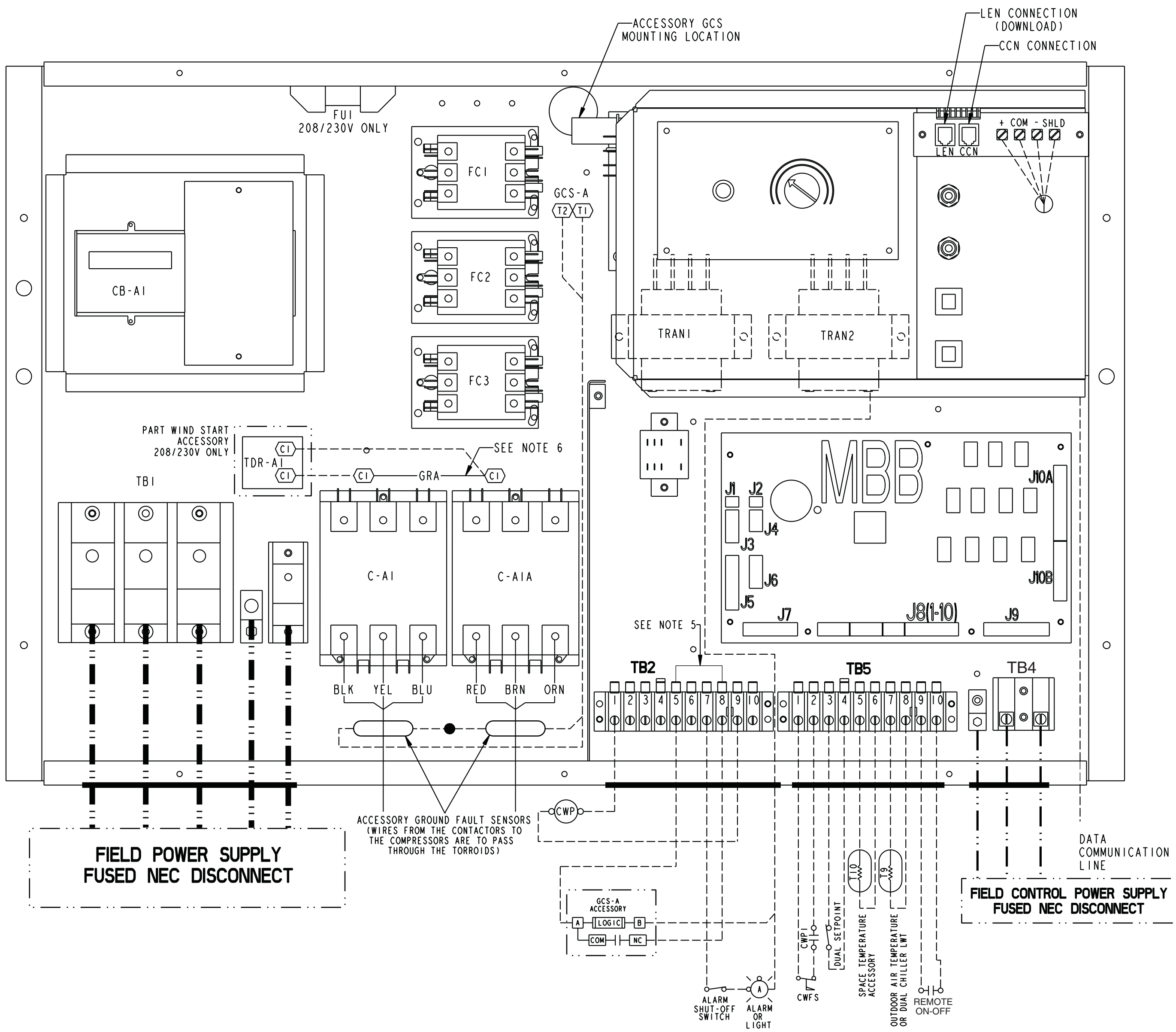
Maximum deviation is 4 v. Determine percent voltage imbalance:

$$\% \text{ Voltage Imbalance} = 100 \times \frac{4}{239}$$

$$= 1.7\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

> IMPORTANT: Contact your local electric utility company immediately if the supply voltage phase imbalance is more than 2%.



LEGEND

C	—	Compressor Contactor
CB	—	Circuit Breaker
CCN	—	Carrier Comfort Network
CWFS	—	Chilled Water Flow Switch
CWP	—	Chilled Water Pump
CWPI	—	Chilled Water Pump Interlock
FC	—	Fan Contactor
GCS	—	Ground Current Sensor
LEN	—	Local Equipment Network
MBB	—	Main Base Board
NEC	—	National Electrical Code (U.S.A. Standard)
TB	—	Terminal Block
TDR	—	Time Delay Relay
TRAN	—	Transformer

Field Power Wiring
Field Control Power Wiring
Field Control Wiring
Factory-Installed Wiring
Field-Installed Device

NOTES:
1. Factory wiring is in accordance with the National Electrical Code. Any field modifications or additions must be in compliance with all applicable codes.
2. Connect separate source of control power from field supplied fused disconnect to terminal 1 of TB4. Neutral side must be connected to terminal 2. This provides power for the unit control circuit, cooler heater and compressor crankcase heater.
3. All field interlock contacts must have minimum rating of 360 va pilot duty plus capacity required for field-installed equipment.
4. For internal unit wiring reference wiring book or unit wiring label diagram.
5. For GCS accessory, remove jumper wire between terminals 5 and 8 on terminal block TB2.
6. For part wind start accessory, remove gray jumper wire between C-A1-C1 and C-A1A-C1. Time delay relay shown in suggested mounting position.
7. Voltage requirements:

MAIN POWER	CONTROL POWER
208/230-3-60	115-1-60
460-3-60	115-1-60
575-3-60	115-1-60
380-3-60	220-1-60
380/415-3-50	230-1-50

Fig. 8 — Field Wiring Schematic

Step 5 — Install Accessories

ELECTRICAL — A number of electrical accessories are available to provide the following optional features (for details, refer to the Controls, Start-Up, Operation, Service, and Troubleshooting book):

- Energy Management Module (used for any of the following types of temperature reset, demand limit and ice features):
  - — 4 to 20 mA leaving fluid temperature reset (requires field-supplied 4 to 20 mA generator)
  - — 4 to 20 mA cooling set point reset (requires field-supplied 4 to 20 mA generator)
  - — Discrete inputs for 2-step demand limit (requires field-supplied dry contacts)
  - — 4 to 20 mA demand limit (requires field-supplied 4 to 20 mA generator)
  - — Discrete input for Ice Done switch (requires field-supplied dry contacts)
- Chilled fluid flow switch/interlock
- Navigator display:

  Provides hand-held, mobile capability using easy to read 4-line display. Keypad function is the same as the Scrolling Marquee module. Features magnet for 'hands free' service of components.

HOT GAS BYPASS — Hot gas bypass usually is *not* recommended because it results in application of equipment out of its normal design application range. However, if its use is required, the appropriate hot gas bypass package may be used. For installation details, refer to separate instructions supplied with the accessory package.

Step 6 — Refrigerant Circuit

LEAK TESTING — Units are shipped with complete operating charge of R-22 (see Tables 1A-1B) and should be under sufficient pressure to conduct a leak test. If there is no pressure in the system, use standard refrigeration practices to search for the leak. Repair the leak using good refrigeration practices. After leaks are repaired, system must be evacuated and dehydrated prior to recharging with refrigerant.

DEHYDRATION — Refer to Carrier Standard Service Techniques Manual, Chapter 1, Refrigerants, Sections 6 and 7 for details. *Do not use compressor to evacuate system.*

REFRIGERANT CHARGE (Refer to Table 1A or 1B) — Immediately ahead of filter drier in each circuit is a factory-installed liquid line service valve. Each valve has a $^{1}/_{4}$-in. Schrader connection for charging liquid refrigerant.

Book 2 | Tab 5c
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